UNIVERSITI TEKNOLOGI MARA

BIOLOGICAL ACTIVITIES OF FOUR VARIETIES OF *Ficus deltoidea* (JACK) AND CORRELATION TO THEIR FLAVONOID CONTENT

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Thesis submitted in fulfillment
of the requirements for the degree of
Master of Science

Faculty of Applied Sciences

July 2014

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulation of Universiti Teknologi MARA. This thesis is original and it is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This topic has been not submitted to any other academic institution or non-academic institution for other degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

In this study, the aqueous leaves and figs extracts of four varieties of *Ficus deltoidea* (*Fd*) namely *Fdvk* (*kunstleri*), *Fdva* (*angustifolia*), *Fdvd* (*deltoidea*) and *Fdvi* (*intermedia*) were estimated for their total phenolic and total flavonoid contents, and evaluated for their *in vitro* antioxidant, α-glucosidase inhibitory and neuroprotective effects. Their flavonoid constituents and their correlation with their biological activities were also investigated. The TPC and TFC assays estimated that high content of total phenolics (89.10-99.60 mg GAE/g extract) for extracts of *Fdvd* and *Fdvi* but total flavonoids content was significantly higher in *Fdvd*. In the FTC antioxidant assay, the leaves and figs extracts of both *Fdvd* and *Fdvi* showed high percent of inhibition of more than 95% in the FTC assay and 73-79% in the TBA assay. The figs extracts of these two varieties (*Fdvd* and *Fdvi)* also exhibited strong radical scavenging activity in the DPPH assay, with IC_{50} of 7.8 μg/ml. Interestingly, only the leaves extract of both varieties displayed higher inhibition towards α-glucosidase (*Fdvd* > *Fdvi* > *Fdvk* > *Fdva*) compared to the other two varieties and compared to the figs extract indicating the presence of more antidiabetic constituents in the leaves. In the neurotoxicity assay, all samples exhibited no signs of toxicity (> 50% cell viability) against SH-SY5Y neuroblastoma cell and displayed potential neuroprotective effects against H_2O_2-induced toxicity cells. *Fdvd* and *Fdvi* (leaves and figs) showed good neuroprotective potential indicated by high percent of cell viability as determined by the MTS assay. Following chromatography of extracts on a reversed phase C_{18} column, LCMS Q-TOF identified the marker flavonoids of the plants from their *m/z* values as well as by comparison with internal standards. Employing the HCA technique, a dendrogram representing four clusters of flavonoids distribution in the eight samples (based on its distribution values) comprising *epi*catechin, quercetin-3-rutinoside, quercetin 5,4'-di-*O*-beta-*D*-glucopyranoside, myricetin and naringenin were successfully generated. A good correlation was observed between the flavonoid distributions in each plant variety to its biological activities. In conclusion, this study found that the strong activity of *Fdvd* and *Fdvi* could be correlated to the presence of the antioxidant *epi*catechin relatively high amounts in both varieties.

ACKNOWLEDGEMENTS

In the name of Allah, the Most Gracious and the Most Merciful.

Alhamdulillah and thanks to Allah S.W.T for His blessing which enable me to complete my master's project.

Upon completion of this project, I would like to express my gratitude to many parties. My heartfelt thanks go to my supervisor, Professor Datin Dr Rohaya Binti Ahmad who have contributed significantly to this project by giving valuable suggestions and provided several advices from her experiences. I would very much like to thank my co-supervisor, Dr Mazatulikhma Binti Mat Zain for her opinions throughout my study.

Special thanks are due to my parents, siblings and friends for their endless support, patience and love. Finally, I would like to express my gratitude to all the staffs of Faculty of Applied Sciences, Institute of Science (IOS) and Research Management Institute (RMI) for the research facilities and financial support. Thank you for all the supports.

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